SMART ELECTRONICS

HD Cabinets and Counters

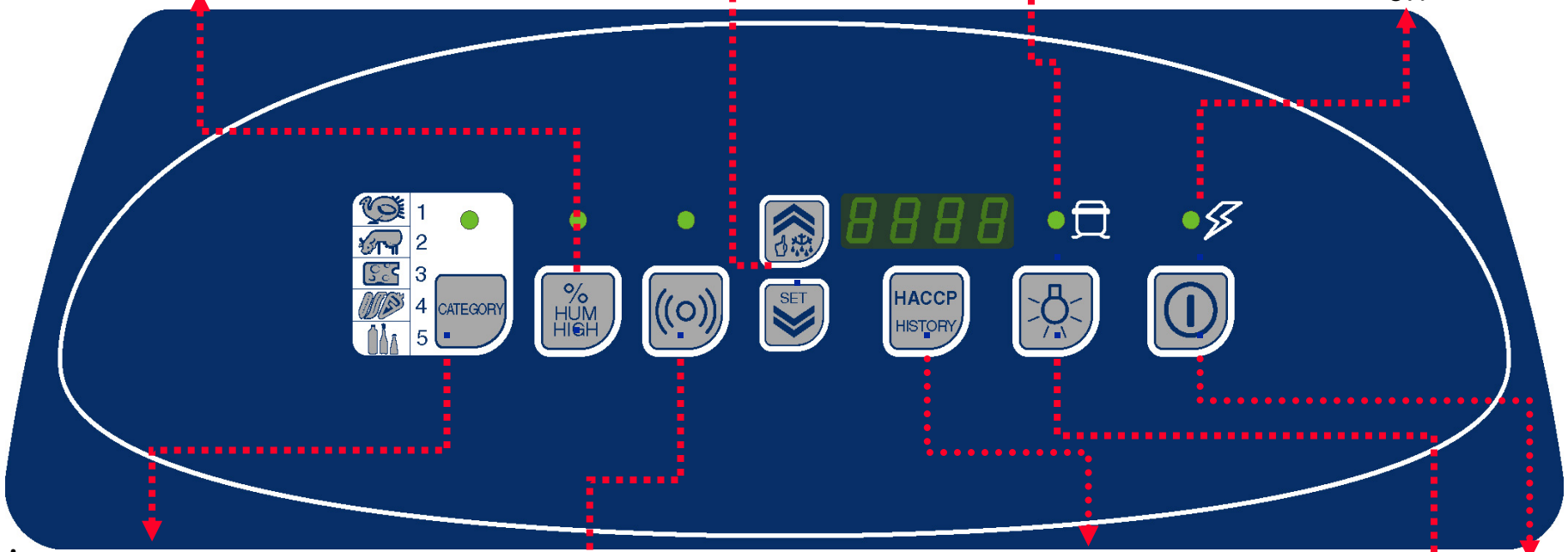
Trainer: Lorenzo Giusti
Customer Support Refrigeration Platform

Electrolux

User interface analisys

REFRIGERATOR

Electrolux



High Humidity -led ON (90%)

Low Humidity -led OFF (75%)

1. Temperature setting
2. Manual defrost

Led ON: compressor running

Led ON: power supply ok

Food category: automatic set of the optimal temperature & humidity for each kind of food

1. To check alarm events
2. Switch OFF alarm buzzer

HACCP: monitoring and keeping all the critical events (high temperature inside)

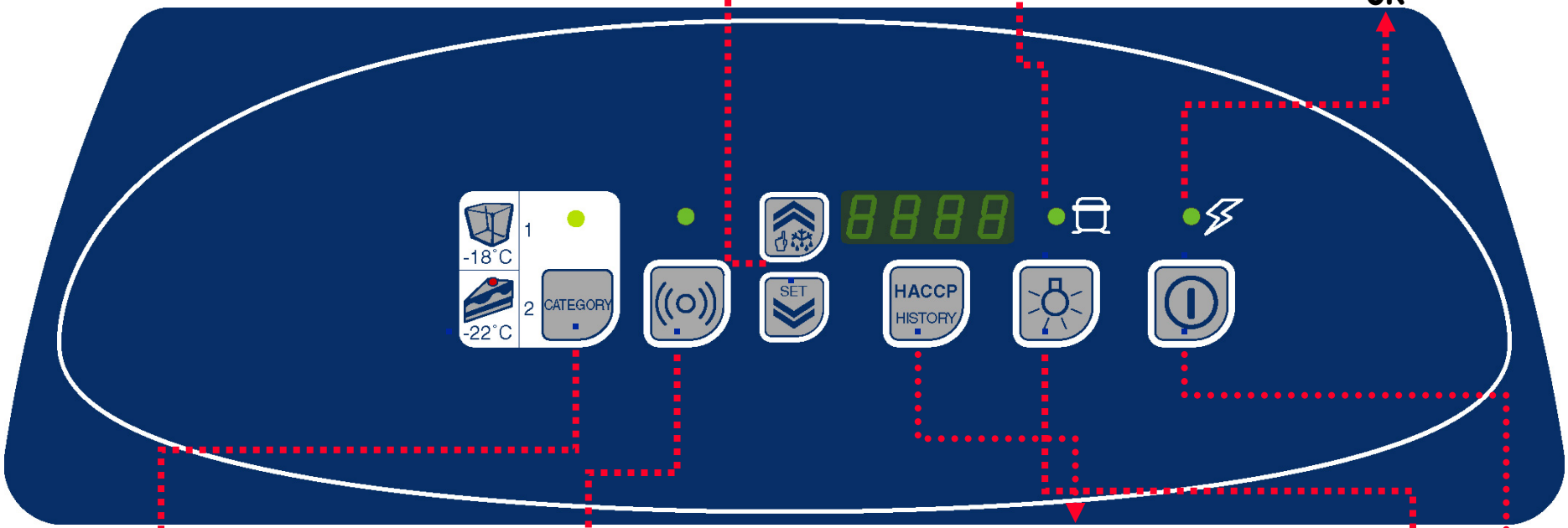
ON/OFF

Light ON/OFF (only glass door)

User interface analisys

FREEZER

Electrolux



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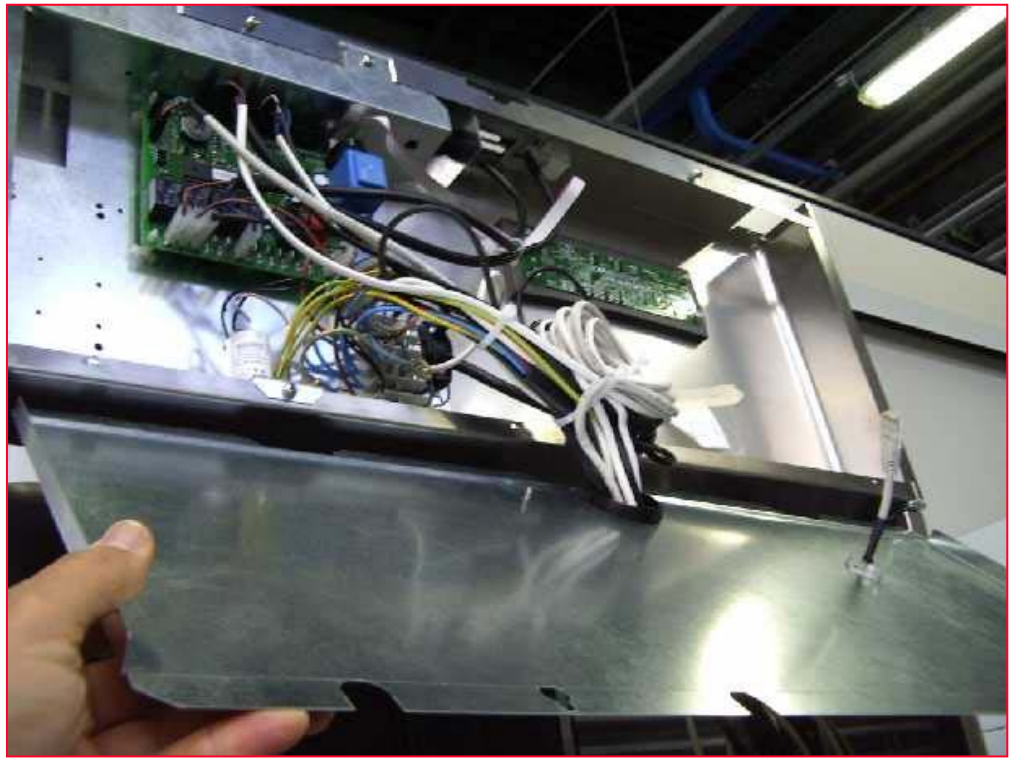
Where can You find IT?

Electrolux

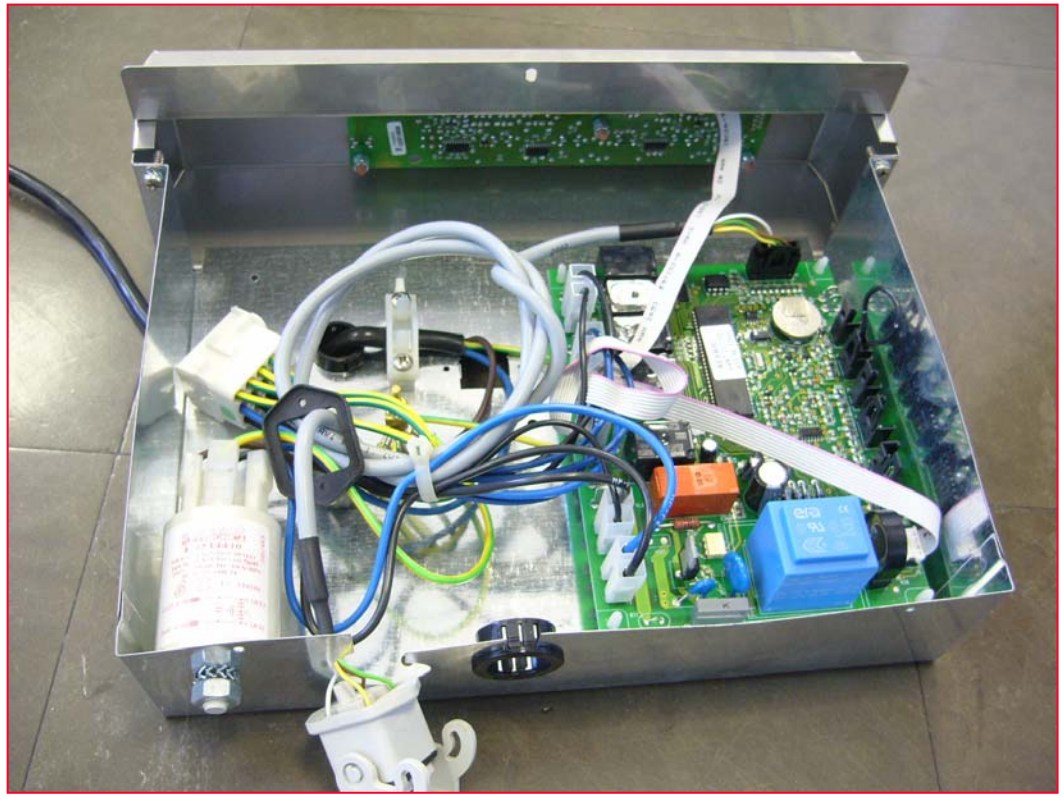


In the HEAVY DUTY Cabinet one door and two doors.

Lift up the control panel and remove the back protection

Where can You find IT?

Electrolux

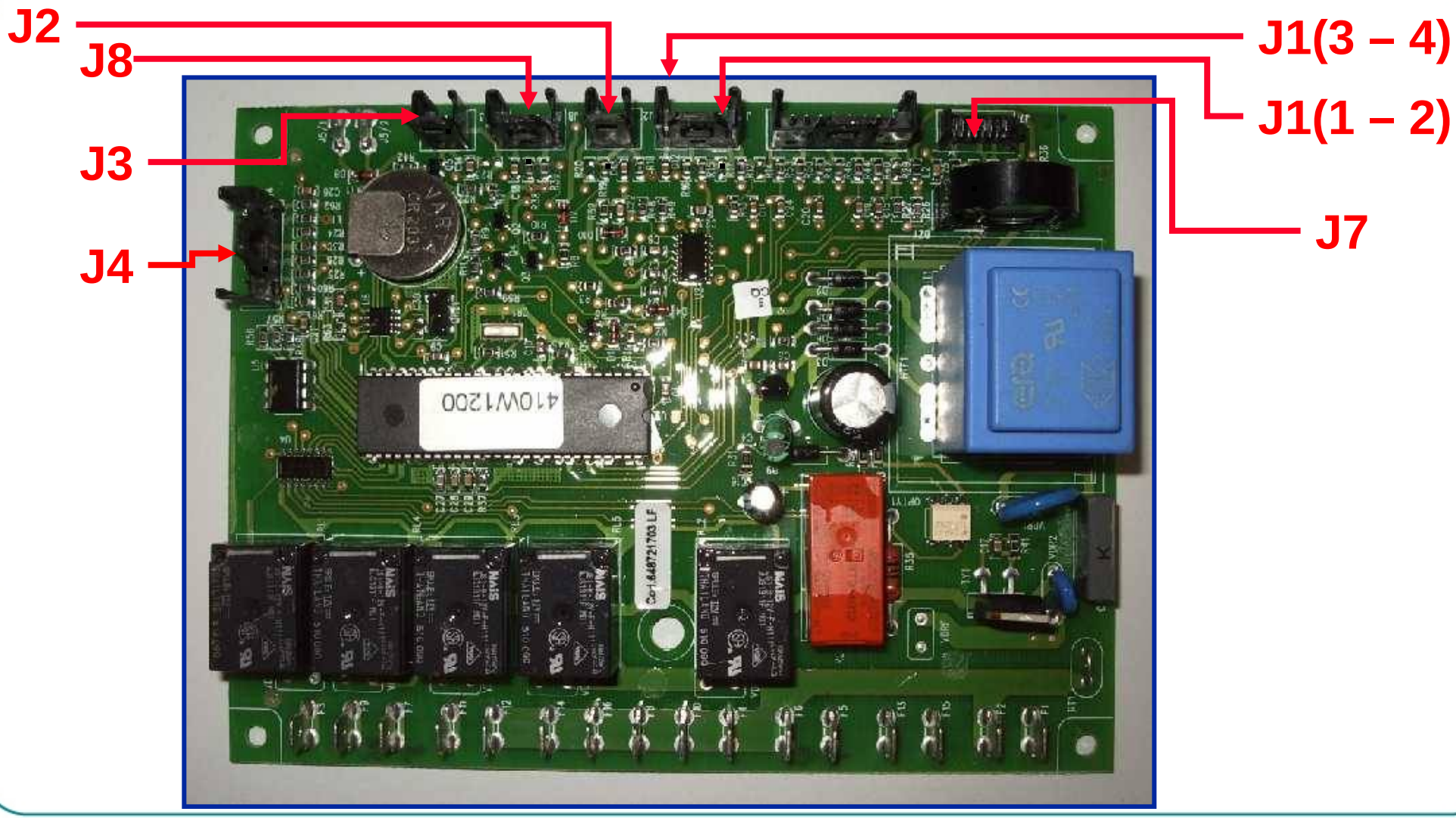


In the HEAVY DUTY Counter freezer and refrigerated

Extract the control panel from table and remove the upper cover protection

DESCRIPTION OF MAIN BOARD

Electrolux

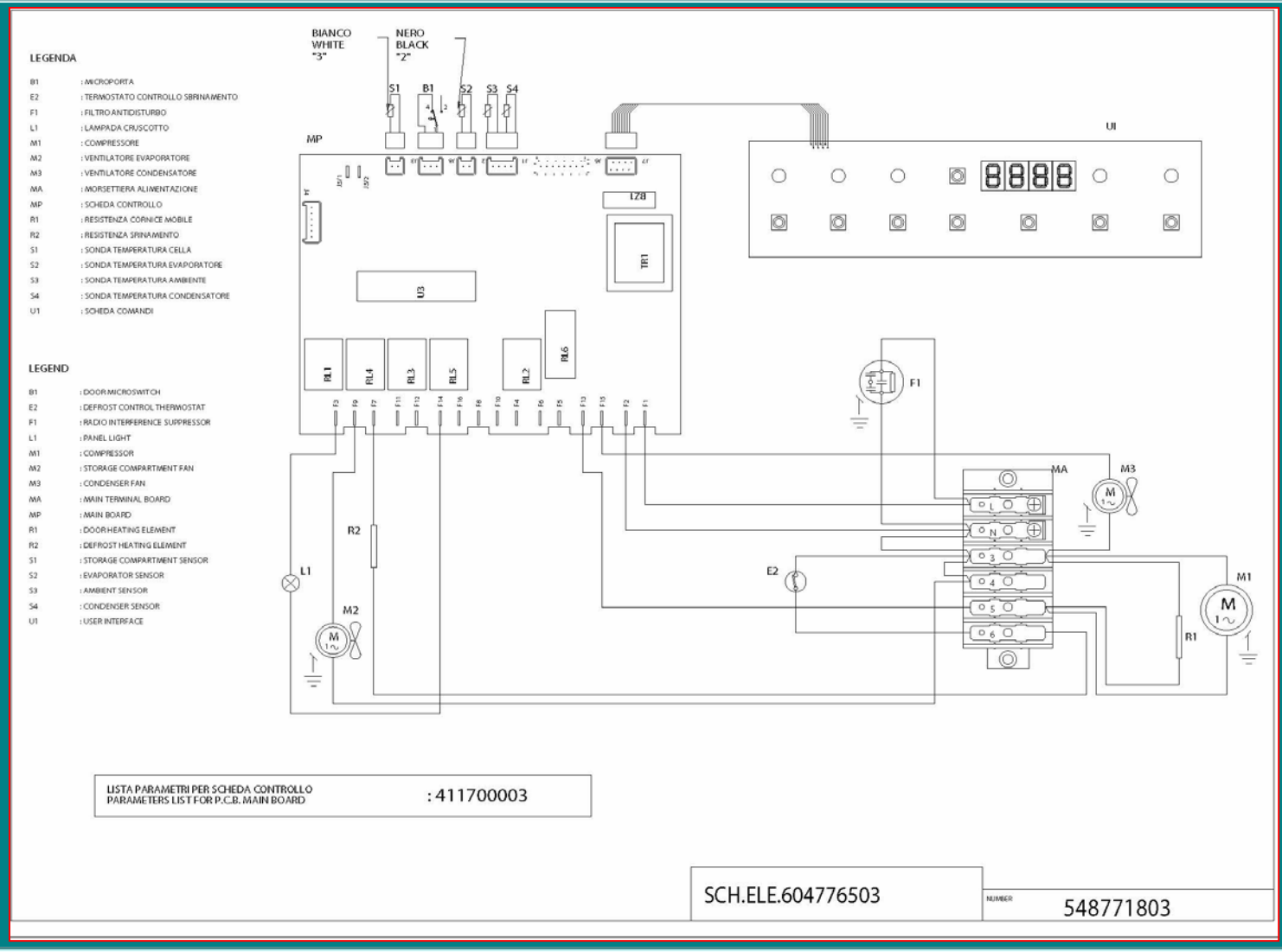


Description of the connectors

Electrolux

Position	Description
J1 POS. 1-2	CONDENSER PROBE CONNECTOR type LUMBERG 2.5 MSF 4
J1 POS. 3-4	AMBIENT PROBE CONNECTOR type LUMBERG 2.5 MSF 4
J2	EVAPORATOR PROBE CONNECTOR type LUMBERG 2.5 MSF 2
J3	INNER CELL PROBE CONNECTOR type LUMBERG 2.5 MSF 2
J4	EXTERNAL COMUNICATION (TTL) FOR R485 MAIN BOARD CONNECTOR type LUMBERG 2.5 MSF 6
J7	USER INTERFACE CONNECTOR
J8	DOOR MICROSWITCH CONNECTOR type LUMBERG 2.5 MSF 3

I.E. Electric diagram



MANUAL Setting Temperature

Electrolux

1. Press the button **ON/OFF**

for 3 seconds.

   Now all of the led in the electronic board are blinking. In this moment the PCB makes a check-up for the functions.

   Then the display visualizes the cell temperature.

2. Press the button **set**

for 3 seconds until the display is blinking.

3. Press the buttons **increase** & **decrease**
to increase or decrease the set cell temperature.

4. The new cell temperature set will be memorized automatically if no button is pressed for 5 seconds.

5. Press the button **% hum/high**

to have the hight humidity in the cell. When the led is ON we have the hight humidity 90%, when the led is OFF we have the low humidity 75%.

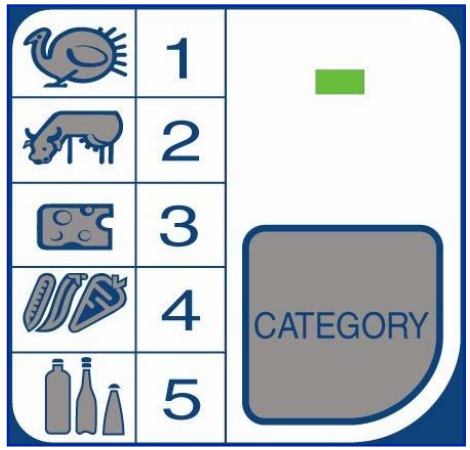
6. Please note that the button **% hum high** is not available in the electronic board for the Freezer.

Set the Food Category (REFRIGERATOR)

Electrolux

WHAT IS FOOD CATEGORISATION?

the optimal temperature & humidity are automatically pre-set for the main typology of food (see below the temperature and humidity)



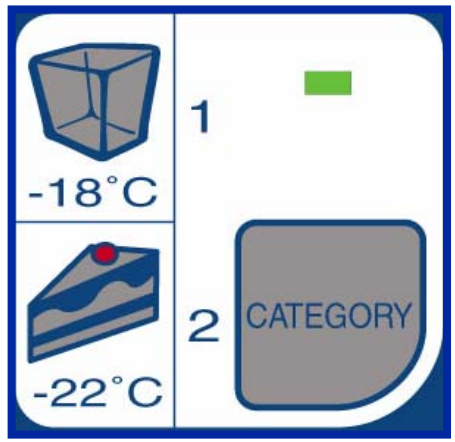
	Category	Type food	Temperature	Umidity
	1	White & game meat	-2°C	90%
	2	Pork & Beef meat	0°C	90%
	3	Cheese,salted meat	4°C	75%
	4	Vegetables & Fruit	6°C	90%
	5	Drinks	8°C	75%

Set the Food Category (FREEZER)

Electrolux

ADVANTAGE FOR THE CHEF MANAGER:

Humidity & temperature are locked at the optimal condition; that permits to avoid the possibilities to set a wrong temperature or humidity (the appliances can work by manual setting: "none" conditions).



	Category	Type food	Temperature	Umidity
	1	Frozen food	-18°C	--
	2	Ice cake	-22°C	--

How to set the category

Electrolux

WHAT TO DO:

Keep pressed

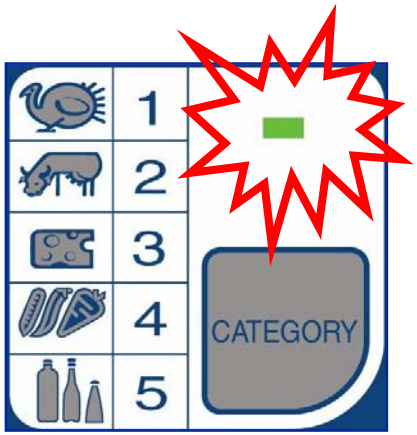
and select category up or

down

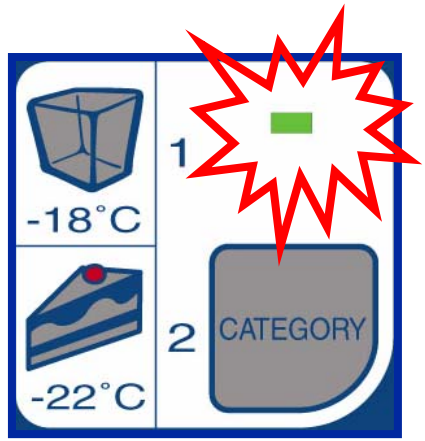
Display shows, for each category, the storage temperature; if high humidity is required the led is blinking

(led ON: categorisation activated, led OFF: manual setting)

Refrigerated



Freezer



How to set the category

The new food category will be memorized automaticaly if button is not pressed for 5 seconds.

In the display will be visualized in the left side the number of the caterory and in the right one the cell set temperature .

N° category Set temperature cell

When the display visualize **NONE**, this means that no food category is programmed.

SMART DEFROST

Electrolux

With the new electronic control the **defrosting cycles are made only when it is necessary (it is an Electrolux patent)**; this means that if the evaporator is covered with ice, a defrosting cycle will be activated, otherwise, no cycles will be activated.

(contrary to traditional solutions where number & duration of defrosting cycle are fixed).

If in any cases if you want start the manual defrost keep pressing the button and if there will be condition of defrost in display will appear the label

"DEFR".

HACCP History

Electrolux

OBJ: 24 hrs. per day temperature monitoring and record keeping of the temperature over the critical limit

ALARM CONDITIONS:

-the display shows an alarm by the label "TEMP".

- pushing the relative button,

you get information on maximum temperature, and on time and date (day, month and year) alarms occurred.

There are two possible situations:

a) the alarm is running
b) the alarm has occurred

HACCP History alarm running

Electrolux

HOW TO CHECK IT?

In the display rolling the label i.e. TEMP +14°C

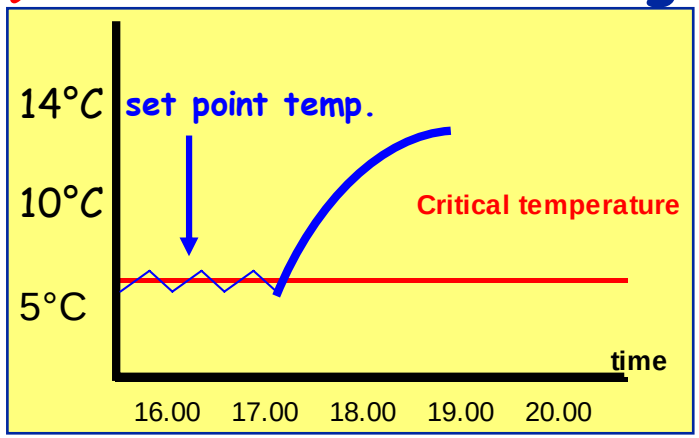
1. Press the button HISTORY and the buzzer switch OFF

2. Press the button HISTORY and the display shows the label "History AL1" with the max temperature

3. Keep Pressed the button HISTORY and display shows the alarm (AL1)
4. Press again the button and the display showed I.E:

Temp 14°C StArt 17:05 01-01-07 end ------

a) the alarm is running

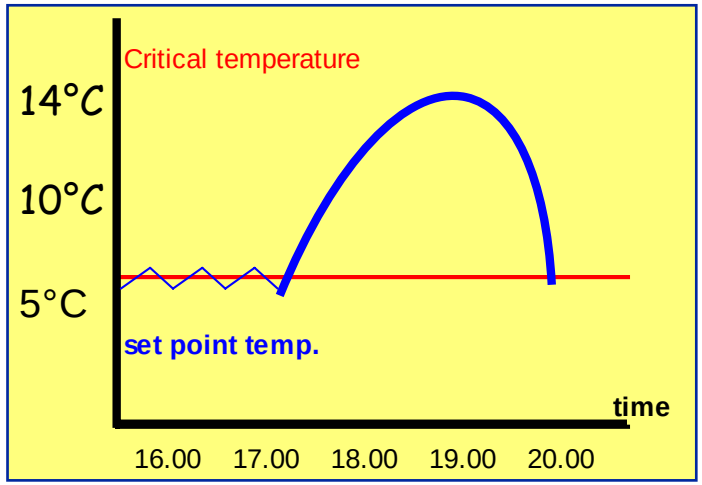


HACCP History alarm already occurred

Electrolux

HOW TO CHECK IT?

b) the alarm has occurred



When the alarm has occurred the display shows the label TEMP

1. Keep Pressed the button

and display shows the alarm (AL1)
2. Press again the button and the display shows I.E:

Temp 14C StArt 17:05 01-01-07 end 18:10 01-01-07

3. After some seconds the display shows the normal temperature

Probes

Electrolux

The unit with the new electronic control is supplied with 4 probes:

"S" - Storage probe: measuring inner temperature
"E" - Evaporator probe: measuring evaporator temperature
"r" - Room probe: measuring ambient temperature
"C" - Condenser probe: measuring condenser temperature

If a probe is broken, the fridge works anyway

(a "traditional" appliance stops working with a broken probe).

If one probe is broken the fridge works according to the recorded temperature of the last 24 h.

Of course an alarm is showed in the display (for more details see Service Alarms)

How to check temperature Probes

Electrolux

1. Pressing the following buttons together

you may see the value of the temperature of the first probe

1. Pressing the buttons

you may gain access to the value of the other probes:

"S" = Storage (or inner cell probe)

"E" = Evaporator

"r" = Room (ambient temperature)

"C" = Condenser (hot gas pipe)

if you do not press any button the board will exit to function mode

Where you can find Them?
i.e. Cabinet

Electrolux

Inside of Evaporator (to defrost)

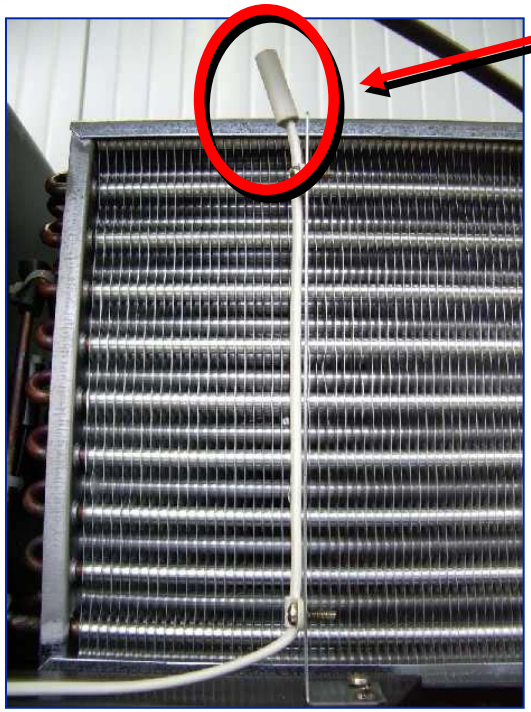
Evaporator probe

Storage Probe

Inside the cell (right side)

Where you can find Them?

Electrolux

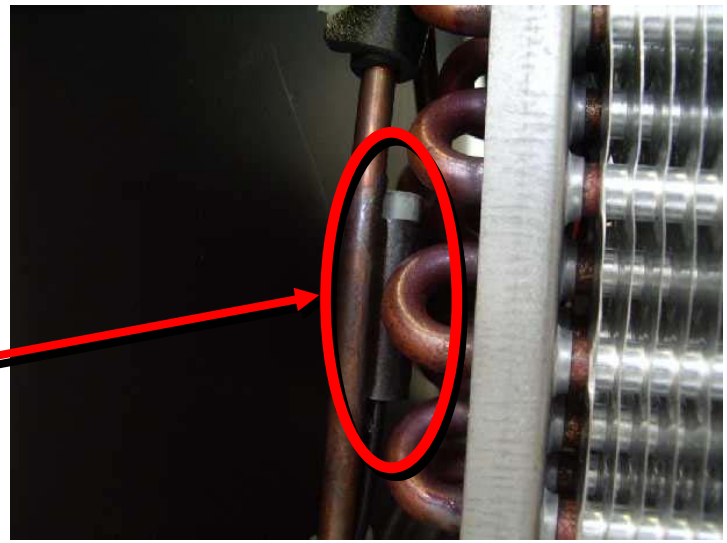


Room probe

In front of condenser (by ventilation)

Condenser probe

In the right side of Condenser



Which type of probes are used in the smart electronic?

Electrolux

Condenser/room probe temperature

1. NTC Semitec 10 K 25°C
2. Length of cable:2000mm
3. Spare parts code 087480

TABELLA DI CONVERSIONE CONVERSION TABLE 10K	
TEMP.	OHM
-40	326K
-30	177K
-20	97K
-10	55K
0	32K
10	19K
20	12K
25	10K
30	8K

Storage - cell probe temperature

1. NTC Semitec 10 K 25°C
2. Length of cable:4000mm
3. Spare parts code 088066

Which type of probes are used in the smart electronic?

Electrolux

Evaporator probe temperature

1. NTC 10 K SMD
2. Range temperature -50÷105°C
3. Length of cable:1500mm
4. Spare parts code 099658

TABELLA DI CONVERSIONE CONVERSION TABLE NTC 10K SMD BETA 3435	
TEMP.	OHM
-40	188.5K
-30	111.3K
-20	67.80K
-10	42.45K
0	27.28K
10	17.96K
20	12.09K
25	10K
30	8.313K

You can identify from:

Black Cable

Cover protection in stainless steel

How to check the performances of the last seven days?

Electrolux

The following parameters are kept and recorded, for 7 days:

- Performance (CAP)"Coefficent appliance's Performance"
- Min and Max "Cell" temperature (S_HI S_LO)
- Min and Max "evaporator" temperature (E_HI E_LO)
- Min and Max "temperature" (r_HI r_LO)
- Min and Max "condenser" temperature (C_HI C_LO)
- "Door opening" number (door)
- "Defrosting" number (dEFr)
- "Run compressor" (Comp %)
- Alarm 2 (AL2)
- Alarm 1 (AL1).

What's means (CAP)?

Electrolux

CAP (COEFFICENT APPLIANCE'S PERFORMANCE)

The ***CAP is a qualitative evaluation*** regarding the utilisation of the appliance. It is based on the working condition of the major components (evaporator, condenser, compressor)

The CAP is displayed as follow:

"OPTM": optimum — the fridge is saving energy and all the major components are working properly

"GOOD": good — the fridge is in a medium condition

"SUF" : sufficient — the fridge is working in heavy condition

How can you check the seven days history

Electrolux

To check out the the history parameters,

1. Press the buttons together for 3 second and the display will show the label (CAP) + "today"

2. Pressing the buttons you may scroll through the last seven days history parameters (Today, day1, day2).

3. Pressing button you may enter/exit the parameters of the selected requested day.

4. With the buttons you may scroll through the parameters of the selected day.

Programming Parameters

Electrolux

The Electronic board allows the adjustment of 94 parameters, through two Programming routines.

1. We have **17 USER PARAMETERS**, these can be visulized and the final customer has direct access to them
2. The remaining **77** parameters, are the **FACTORY PARAMETERS**, they are accessible only to the technicians during extraordinary maintenance.

Please note that the mainboard
for all smart units (cabinets and counters)
is the same,
only parameters change

Programming Parameters
User parameters

Electrolux

1) To have access to the **USER PARAMETERS** press the buttons **increase & decrease** for 4 seconds.
Now the display visualizes the time and the date of the current day (I.E. 10.30 - 02 - 12 - 1999).

2) Press the button **increase** and we visualize the symbol of the first user parameter MIN.

3) Press the button **ALARM SERVICE** and we visualize the value of the first user parameter.

4) Press the button **increase & decrease** to modify the value of the parameter.

5) Press the button **ALARM SERVICE** to memorize the parameters and to go into the next one.

The new user parmeter will be memorized automatically if no button is pressed for 5 seconds.

6) If the printer is connected press together **decrease & ALARM SERVICE** to print all parameters.

User parameters

Electrolux

Name	Setting the real time
MIN	Set the time: minute.
HOUR	Set the time: hour.
DAY	Set the date: day.
MON	Set the date: month.
YEAR	Set the date: year.

User parameters

Electrolux

Name	Alarms
CDIF	Alarm temperature type for cell “A”= absolute “r”= relative (compared to set point)
HAL	High temperature alarm for cell.
LAL	Low temperature alarm for cell.
STO	NOT USED.
BUE	Buzzers enable.

User parameters

Electrolux

Name	Display and Printer
FHUM	Humidity setting. "Enable and disable the humidity button"
DIR	Display resolution. "Full number" "Decimal number"
ADR	Network address (for HACCP connection).
ERTC	Enable internal Real Time Clock.
E485	Enable external Printer or Personal Computer. "PRN= Printer PC= Personal Computer"

User parameters

Electrolux

Name	Printer
TPRN	Printing interval time
PRND	Enable short daily report. "Y"= print only alarms "N"= print temperature cell and alarms
REL	Firmware release. Read only.

Programming Parameters
Factory parameters

Electrolux

1) To have access into the **FACTORY PARAMETERS** press the buttons **increase & decrease** for 4 seconds.
Now the display visualizes the time and the date of the current day (I.E. 10.30 - 02 - 12 - 1999).

2) Press the button **increase & decrease & ALARM SERVICE** and we visualize the symbol of the first user parameters dIFP

3) Press the button **ALARM SERVICE** and we visualize the value of the first user parameter.

4) Press the button **increase & decrease** to modify the value of the parameter.

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User parameters

Electrolux

Name	SET POINT Setting
DIFP	Positive differential (re-start compressor). Set +DIFP
DIF-	Negative differential (stop compressor). Set - DIF
HSP	Higher set-point.
LSP	Lower set-point.
DLY	Delay time for compressor. "On power ON"

User parameters

Electrolux

Name	Alarm setting
ADI	Alarm differential "High /low temperature"
ADY	Alarm delay. "High /low temperature"
AOR	Alarm time after power on.
DOT	Door open timeout.
LTE	Low temperature on evaporator.

User parameters

Electrolux

Name	Defrost
HTC	High temperature of condenser. "alarm"
DCS	Defrosting counting system. ABS= absolute time HCP= working hours of compressor
DFS	Defrosting Type. ELE= electrical HOG= hot gas
DON	Defrost on power on.
DDY	Defrost delay time; "Only if DFS=HOG"

User parameters

Electrolux

Name	Defrost
DOD	Defrost delay at power on.
DIN	Defrost interval between two defrosting cycles.
DTO	Defrost timeout.
DST	Defrost stop temperature.
TOD	Used to correct the temperature visualised after a defrost operation (timeout).

User parameters

Electrolux

Name	Defrost
DRT	Drainage time.
TDF	Evaporator fan temperature delay to start.
CETO	Timeout for evaporator fan after defrost (if TDF parameter is not reached).
DFO	Time alarm after defrost

User parameters

Electrolux

Name	Other parameters
UNI	Measure Unit "C= Celsius degrees" "F= Fahrenheit degrees"
P4T	Enable printing temperature of all probes. Y= printing temperature all four probes N= printing temperature only probe cell
CAL	Cell temperature calibration .
TCELL	Cell sensor type. Nus= not used; NTC1= 2K7 sensor; NTC3= 10K sensor (SEMITEC)
TEAP	Evaporator sensor type. Nus= not used; NTC2= 10K sensor; NTC3= 10K sensor (SEMITEC)

User parameters

Electrolux

Name	Other parameter
TROO	Room sensor type. Nus= not used; NTC2= 10K sensor; NTC3= 10K sensor (SEMITEC)
TCND	Condenser sensor type. Nus= not used; NTC2= 10K sensor; NTC3= 10K sensor (SEMITEC)
FRE	Mains frequency selection.
BT	Model identification BT= freezer TN= Refrigerated
SMEN	Type of defrost. Y= smart defrost N= traditional defrost

Service alarm

Electrolux

- To have acces into the **SERVICE ALARM** press the button

for 4 seconds.
- Now the display visualizes the first SERVICE ALARM memorized in the electronic board, example "**b 1**" (door open).
- Press the button

to visualize the next SERVICE ALARM memorized in the electronic board.
- When the electronic board have not memorized other SERVICE ALARMS , the display visualizes "**- - - -**" .
- If no button is pressed for 5 second we go out from the SERVICE ALARM .

Service alarm Type "b"

Electrolux

"Description alarms showed in the display"

LABEL	TYPE	ACTION
b01	DOOR OPEN	Check the door
b02	HACCP alarm full	Reset history memory
b03	High temp. condenser	Check the condenser if is dirty or air circulation covered
b04	Power failure	Probably the units has not been switched off using the ON/ OFF button

Service alarm Type "E"

Electrolux

"Description alarm showed in the display"

E01	S_SC (storage sensor)
	"Sensor short-circuited."
E02	S_OP (storage sensor)
	"Sensor is broken or disconnected."
E03	E_SC (evaporator sensor)
	"Sensor short-circuited."
E04	E_OP (evaporator sensor)
	"Sensor is broken or disconnected."
E05	R_SC (room sensor)
	"Sensor short-circuited."

E06	R_OP (room sensor)
	Sensor is broken or disconnected.
E07	C_SC (condenser sensor)
	Sensor short-circuited.
E08	C_OP (condenser sensor)
	Sensor is broken or disconnected.
E09	LTCL (storage sensor)
	Low cell temperature.
E10	LTEP (evaporator sensor)
	- Low evaporator temperature.

REMOTE CONNECTION ALARM IN SMART ELECTRONIC